

Using the Transit of Venus to Calibrate Solar Telescopes in Space



Dark regions seen in extreme ultraviolet images of the solar corona, coronal holes, are believed to be where high-speed solar wind originates; while the boundaries are believed to be where slower solar wind originates. Understanding these regions and the dynamics of the solar wind is an important part of the study of space weather.

Due to the low intensities within coronal holes, scattered light within a telescope can introduce significant error in measurements. Thus, it is vital that the scattered light component to coronal hole measurements be quantified. Ideally scattered light should be characterized before the launch of a space instrument, but technical limitations or time constraints can prevent this.

The very rare Transit of Venus in June 2012 provided a unique opportunity for scientists to more accurately quantify scattered light using the planet and its shadow as they traverse the Sun. This work describes the application of these observations to improve the calibration of solar data from the Solar Dynamics Observatory and Hinode.



An image from the Solar Dynamics Observatory of the Sun in extreme ultraviolet light near the end of the June 2012 Transit of Venus. This image of the Sun's corona shows a dark area to the left (a coronal hole) and a dark circle, Venus, to the right off the limb (edge) of the Sun.

Peter R. Young (671) & Nicholeen M. Viall (671), 2022: "Scattered Light in the Hinode/EIS and SDO/AIA Instruments Measured from the 2012 Venus Transit," *The Astrophysical Journal*, 938, 27, DOI: 10.3847/1538-4357/ac8472